

## HUODENDRON, A NEW GENUS OF STYRACACEAE

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*With plates 151 and 152 and one text figure.***Huodendron**, gen. nov.

Flores hermaphroditi, actinomorphi, pentameri; calycis tubus ovario adnatus, dentibus 5 triangularibus vel ovatis circiter dimidium tubum aequantibus; petala 5, initio basi coherentia, demum libera, lineari-oblonga, anguste imbricata vel valvata, sub anthesi revoluta; stamina 7–10, uniserialia, libera, petalis subaequilongia, sed ob petala revoluta valde exserta, filamentis complanatis linearibus, antheris anguste oblongis introrsis, loculis distinctis, connectivo cum filamentis continuo et supra antheras in appendicem conspicuum tri- vel rarius bidentatum elongato; ovarium inferum, triloculare; styli 3, triente inferiore vel fere ad apicem connati, stigmatibus capitellatis; ovula in quoque loculo numerosa, axi centrali affixa, erecta. Fructus capsularis, ovoideus, parva, triente infra apicem sepalis circumcincta, trilocularis, loculicide dehiscens, valvis interdum demum septicidis, endocarpio crustaceo, exocarpio tenui; semina numerosa, scobiformia, minuta, oblonga vel elliptico-oblonga, leviter complanata, testa tenui reticulata, basi et apice fimbriata et saepius ad marginem sparse breviterque fimbriata, albuminosa, embryo centralis, rectus. — Arbor vel frutex ramis gracilibus, gemmis parvis nudis pubescentibus; folia decidua, alterna, petiolata estipulata, ovato-elliptica vel ovato-oblonga, acuminata, basi cuneata, integra vel remote minuteque denticulata, glabra vel fere glabra, penninervia, nervis curvatis anastomosantibus; inflorescentiae terminales et axillares, paniculatae vel subcorymbosae, ebracteatae et ebracteolatae, floribus satis parvis albis graciliter pedicellatis; capsula parva, pedicello recurvo.

Ab aliis Styracacearum generibus, petiolis et staminibus liberis vel fere liberis, filamentis supra antheram in appendicem 3-vel 2-dentatum elongatis, stylo 3-fido, capsula valvis 3 dehiscente, seminibus scobiformibus numerosis bene distincta. Ob semina numerosa *Alniphylo* affinis videtur, sed petalis et staminibus liberis, stylo trifido, connectiva appendiculato, capsula 3-loculari subinfera, seminibus scobiformibus circiter 1 mm. longis facile distinguitur.

TYPE SPECIES: *Huodendron tibeticum* (Anthony) Rehd.

DISTRIBUTION: The genus is restricted to southern China and extends

northwest across the border into southeastern Tibet and northeastern Burma and south into northern Tonkin, where it occurs near Lao-kay, about 150 km. southeast of Mengtze. Within China it ranges from western Yunnan through southern Kweichou, to Kwangsi and Kwangtung. Of the two species *H. tibeticum* is restricted to southeastern Tibet, about N. Lat. 29°, while *H. biaristatum* ranges from northeastern Burma to Kwangtung and extends south into Tonkin; it does not seem to occur north of N. Lat. 25°.

The two species now known of the new genus were originally both referred to the genus *Styrax* to which the flowers bear a great resemblance, but the fruit is entirely different. In *Styrax* the fruit is indehiscent or irregularly dehiscent and contains only one or two rather large subglobose or ellipsoid seeds, while the fruit of *Huodendron* resembles strongly that of some Saxifragaceae-Hydrangeae, as *Deutzia* and *Hydrangea*, in shape and size and dehiscence of the capsule and in the numerous scobiform seeds; also the divided style recalls Saxifragaceae, and in some species of *Deutzia* the flattened filaments are elongated beyond the anther or are dentate at the apex. The petals and stamens fall off separately after anthesis, though in bud they are cohering at the very base; in Styracaceae free stamens and petals are very rare. Any doubt, however, one might have in regard to the affinity of *Huodendron*, is convincingly set at rest by the nodal structure of the stem, which shows the unilacunar nodes characteristic of all Ebenales, while the Rosales have trilacunar or quinquelacunar nodes, as pointed out by Dr. I. W. Bailey to whom I am indebted for the examination of the stem.

As type of the genus I have selected *Huodendron tibeticum*, because this species represents the distinctive characters from *Styrax* and other allied genera in a more pronounced degree, particularly by the deeply divided style and by the absence of stellate or fascicled pubescence and also in the distinctly corymbose inflorescence.

For the loan of additional specimens supplementing the material in the herbarium of the Arnold Arboretum (A. A.), I am indebted to Dr. E. D. Merrill of the New York Botanical Garden (N. Y.), Dr. H. L. Mason of the University of California (U. Calif.) and to Sir William Wright Smith of the Royal Botanic Garden of Edinburgh (Edinb.).

I take pleasure in associating with this new genus the name of Dr. H. H. Hu, director of the Fan Memorial Institute of Peiping, one of the foremost and active Chinese botanists, who has contributed and is still contributing extensively to our knowledge of the flora of China.

***Huodendron tibeticum*** (Anthony), comb. nov.

*Styrax tibeticus* Anthony in Not. Bot. Gard. Edinb. 15: 245 (1927).

Arbor vel frutex 6–25 m. altus, ramis gracilibus teretibus vel apicem versus leviter complanatis glabris; folia alterna, sed interdum apicem ramulorum versus subopposita, decidua, papyracea, elliptico-ovata vel oblongo-ovata vel ovato-lanceolata, 6–11.5 cm. longa et 2.5–4 cm. lata, longe acuminata apice mucronulata, basi late cuneata, integra, nervis utrinsecus 5–9 utrinque leviter elevatis, costa apicem versus supra leviter

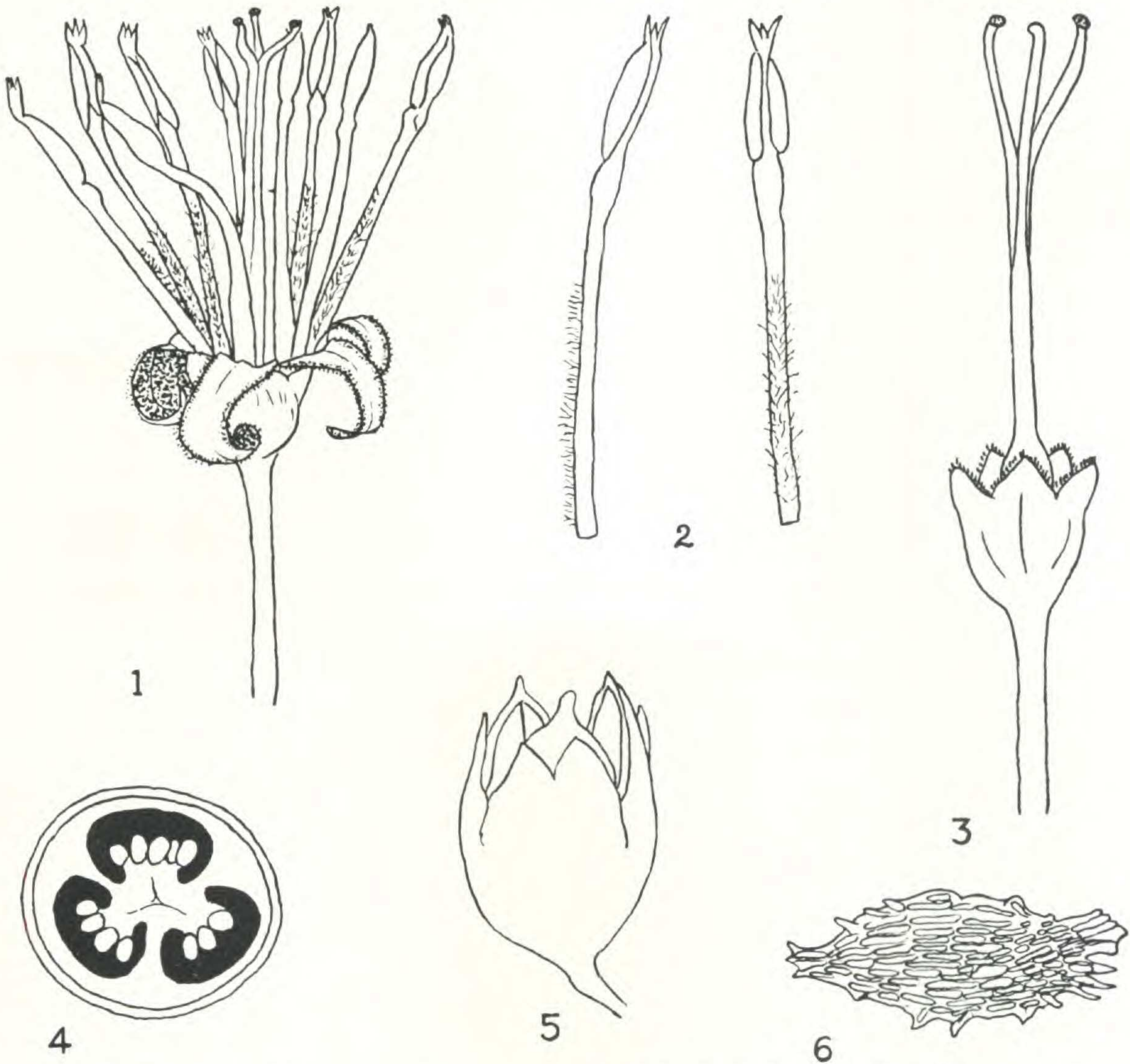


FIGURE 1. HUODENDRON TIBETICUM (Anth.) Rehd. 1. Flower.  $\times 7$ . — 2. Stamens.  $\times 8$ . — 3. Flower with petals and stamens removed.  $\times 8$ . — 4. Cross-section of ovary.  $\times 20$ . — 5. Capsule.  $\times 10$ . — 6. Seed.  $\times 35$ .

elevata basin versus plana, subtus manifeste elevata; petioli glabri, 5–10 mm. longi, supra leviter canaliculati. Inflorescentia glabra, corymboso-paniculata, terminalis 5–7 cm., lata, laterales cum pedunculo 1.5–3 cm. longo 4–8 cm. longa et 2.5–5 cm. lata; pedicelli graciles, 3–5 mm. longi, ut ramuli glanduloso-verruculosi; calycis tubus cupuliformis, glanduloso-verruculosus, 1 mm. longus, dentibus triangulari-ovatis dimidium tubum

subaequantibus ciliolatis; petala valvata, lineari-oblonga, 6–7 mm. longa et 1–1.5 mm., lata, obtusiuscula, extus tomentosula, intus fere glabra, sub anthesi revoluta; stamina petiolis subaequalonga, filamentis 4–5 mm. longis intus triente inferiore excepto villosis extus glabris, antherae 1.25–1.5 mm. longae, glabrae, apice tridentato circiter 1 mm. longo, dente medio lateralibus plerumque brevioribus, styli in triente inferiore vel ad medium connati, graciles, glabri; discus glaber. Capsula pedicello plus minusve recurvo suffulta, ovoidea, 3 mm. longa, fusco-brunnea, subinfera; semina brunnea, circiter 1 mm., longa.

SOUTHEASTERN TIBET. T s a r o n g : Salween and Kiu-chiang divide, northwest of Si-chi-to, Lat. 28° 35' N., Long. 98° 30' E., alt. 10–11000 ft., *G. Forrest*, no. 21648, June 1922, "shrubby, 20–30 ft., flowers fragrant, white, in open thickets by streams" (holotype in herb. Edinb.); same locality, *G. Forrest*, no. 22882, Oct. 1922 (paratype in herb. Edinb.); Salween and Irrawaddi divide, near banks of Salween at Champutong, forests, alt. 7000 ft., *J. F. Rock*, no. 22020, May–July 1932, tree 70–80 ft. tall, flowers white (A. A., N. Y., U. Calif.); mountains west of Champutong, forests of upper Salween River, alt. 9000 ft., *J. F. Rock*, no. 22474, Oct. 1932 (A. A., N. Y., U. Calif.).

This species has a very restricted distribution and is apparently confined to the mountains of extreme southeastern Tibet between the headwaters of the Irrawaddi and Salween Rivers. In some of its characters, particularly by the deeply divided style and by the absence of stellate or fascicled pubescence is it farther removed from other styraceous genera than the more widely distributed *H. biaristatum*. The fruiting branch of this species has some resemblance to certain species of *Deutzia*.

**Huodendron biaristatum** (W. W. Sm.), comb. nov.

*Styrax biaristatus* W. W. Smith in Not. Bot. Gard. Edinb. 12: 233 (1920).—C. E. C. Fischer in Kew Bull. Misc. Inform. 1933: 365.

Frutex vel arbor 6–12 m. altus, ramis gracilibus hornotinis initio tomentosulis demum glabrescentibus, vetustioribus flavido-cinereis vel fusco-cinereis cortice demum rimoso vel fibroso vestitis. Folia alterna, papyracea, oblonga vel elliptico-oblonga vel obovato-oblonga, 8–17 cm. longa et 2.5–6 cm. lata, acuminata, basi cuneata, margine minute et remote denticulate vel integra, supra luteo-viridia, opaca, costa fasciculato-pilosula excepta glabra, subtus vix pallidiora, axillis saepe barbularis exceptis glabra, costa supra leviter impressa subtus elevata, nervis utrinsecus 5–9 arcuatis margine anastomosantibus supra vix infra manifeste elevatis, venulis subtus elevatis; petioli 6–15 mm. longi, supra tantum vel undique fasciculato-pilosi. Inflorescentiae terminales et axillares, paniculatae, multiflorae, 3–10 cm. longae, ebracteolatae, cinereo-

tomentellae; pedicelli 2–5 mm. longi; calyx cupuliformis, tomentellus, tubo 1–1.5 mm. longus, dentibus late triangularibus acutiusculis tubo brevioribus; petala imbricata, anguste oblonga, 6–9 mm. longa et 2–2.5 mm. lata, utrinque tomentella; stamina petalis subaequilonga, filamentis compressis utrinque dense pilosulis circiter 3 mm. longis, antheris glabris 2 mm. longis connectivo dorso puberulo in appendicem tridentatum vel rarius bidentatum elongata dentibus lanceolatis acutis medio plerumque minore; stylus staminibus paullo longior, crassus dense pilosulus, apice 3-lobata; ovarium semisuperum. Capsula ovoidea, resupinata, 4–5 mm. longa, cinereo-tomentella, in triente superiore sepalis persistentibus cincta; semina 1–1.25 mm. longa, flavo-fusca.

CHINA. Y u n n a n : in thickets in ravines on the western flank of the Shweli-Salween divide, Lat.  $25^{\circ} 40' N.$ , alt. 9000 ft., *G. Forrest*, no. 18020, May 1919, "shrub 20–30 ft., flowers fragrant, creamy-yellow" (syntype in herb. Edinb.); side valleys of the Shweli-Salween divide, Lat.  $25^{\circ} N.$ , alt. 8000 ft., *G. Forrest*, no. 17894, June 1919, "shrub 10–20 ft., flowers immature" (Edinb., A. A.); N'Maikha-Salween divide, at Ho-tou, in thickets and open forests, Lat.  $25^{\circ} 55' N.$ , alt. 7–8000 ft., *G. Forrest*, no. 18400, Aug. 1919, "shrub 12–18 ft., in fruit" (syntype in herb. Edinb.); same locality, *G. Forrest*, no. 18833, Nov. 1919 (syntype in herb. Edinb.); Mengtze, S. E. mountain forests, 6000 ft., *A. Henry*, no. 10764 "tree 15 ft." (syntype in herb. Edinb., A. A., N. Y.); Mengtze, *A. Henry*, no. 13662A, "shrub 10 ft." (syntype in herb. Edinb.; A. A., N. Y.); south of Red River, *A. Henry*, no. 13662, "tree 40 ft." (syntype in herb. Edinb.; A. A.); Shweli-Salween divide, Lat.  $25^{\circ} 10' N.$ , Long.  $98^{\circ} 50' E.$ , alt. 9000 ft., in open thickets and forests, *G. Forrest*, no. 26108, Dec. 1924, "tree 30–40 ft." (Edinb., N. Y.); without precise locality, *G. Forrest*, no. 26108, 1924–25 (Edinb., N. Y.). K w e i c h o u : Waichai, Tuh-shan, near border of Kwangsi, alt. 330 m., in densely shaded ravine, *Y. Tsiang*, no. 6686, Aug. 25, 1930, "tree 6 m., diam. of trunk 12 cm., bark pale gray" (A. A.). K w a n g s i : Chin-fong, Lin-yuin-hsien, valley forest, alt. 1300 m., *Steward & Cheo*, no. 336, May 6, 1933, "tree 7 m., flowers white, fragrant" (A. A., N. Y.); Ta-tse-shan, Yung-hsien, forest, alt. 540 m., *Steward & Cheo*, no. 843, Aug. 21, 1933, "tree 9 m., fruit gray" (A. A., N. Y.).

BURMA: Myitkyina Distr., Htangan, 3100 ft., *Sukoe* per *C. E. Parkinson*, no. 9197; Pyet Pass, 7200 ft., *Sukoe* per *C. E. Parkinson*, no. 10115 (ex *C. E. C. Fischer*, l. c.).

TONKIN: route de Lao-kay à Chapa, alt. 1500 m., *A. Petelot*, no. 3803, Aug. 1930 (N. Y.); massif du Fan-tsi-pou, chemin du col de Lo-qui-ho, environs de Chapa, alt. 1400 m., *A. Petelot*, no. 4373, Sept. 1931 (N. Y.).

This species is readily distinguished from *H. tibeticum* by the pubescent inflorescence, the thicker texture of the leaves, the pubescent stout style 3-lobed only at the apex, the shorter filaments pubescent on both sides, the broader narrowly imbricate petals pubescent on both sides and the tomentulose capsules. The fact that the petals in one species of this genus are valvate and in the other imbricate is not unusual in Styracaceae, for both kinds of aestivation are found in *Styrax*. The stamens are mostly 3-toothed at the apex, but the middle one is often shorter than the lateral ones; two teeth, as implied by the specific epithet, are only occasionally found.

The leaves of *H. biaristatum* show some variation in dentation, texture, pubescence and in the number of veins. The Forrest specimens have remotely denticulate leaves and are of rather thin texture, the leaves of the Henry specimens are occasionally furnished with minute denticulations reduced to a mucro, but are mostly entire like the other specimens and like those are of thicker chartaceous or subcoriaceous texture. The midrib is usually impressed and puberulous like the petiole, but in Petelot 4373 from Tonkin the midrib is glabrous except slightly puberulous toward the base and slightly elevated and quite glabrous toward the apex, also the lateral veins are slightly elevated and number about 5 pairs, while the leaves of the other specimens have mostly 6 or 9 pairs; by these characters this Petelot specimen approaches the following variety and connects it with the typical form.

**Huodendron biaristatum** var. **parviflorum** (Merrill), comb. nov.

*Styrax parviflora* Merrill in Jour. Arnold Arb. 8: 15 (1927).

A typo recedit praecipue ramulis foliis petiolisque glabris foliis magis coriaceis integris nervis utrinsecus 4-6, costa media nervisque supra glabris et elevatis, venulis subtus minus conspicuis.

CHINA. K w a n g t u n g : Lung-t'au Mountain, near Iu, in forest, Canton Christian College, nos. 12070 (holotype in hb. N. Y.; A. A.) and 12349 (paratype in hb. N. Y.; A. A.).

The flowers and fruits of the Kwangtung specimens, as far as can be judged from the rather poor material, are identical with those of typical *H. biaristatum* and the difference in the leaves does not seem sufficient to separate the Kwangtung form as a distinct species, considering the fact that the leaves of *H. biaristatum* show considerable variation and transitions to this variety.

HERBARIUM, ARNOLD ARBORETUM,  
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